Specifications of Sniffer4D Mobile Air Quality Mapping System (2019.08.05)			
Category	**Component**	**Main specifications and functions**	*Remarks*
Mandatory Components Compulsory for every Sniffer4D, net weight: 350g.	Main Data Processing Unit	*1 GHz ARM processing chip, 512MB running memory; *Data fusion and encryption; *Data retrieval algorithm - when the connection between a Sniffer4D and a computer breaks down, all the collected data during this period (up to 9 hours) will be temporarily stored in the MDPU and will be automatically transmitted to the receiving computer after the connection is restored; *Status LEDs (main program status, sensing module status, GPS status, SD card status, etc.), which are convenient for users to know the current status of the device; *Fully support DJI Payload SDK; *When the optional 4G Data Transmission Module (see below for details) is connected, ① the real-time data of one Sniffer4D can be transmitted to multiple designated computers in various locations, ② the real-time data of multiple Sniffer4Ds in various locations can be transmitted to one designated computer, ③ the real-time data of multiple Sniffer4Ds in various locations can be transmitted to multiple designated computers in various locations.	*The mandatory components are not separable and cannot be sold separately. Must be used with at least 1 optional sensing modules.*
	433MHz Radio Telemetry system	*Built-in radio telemetry system to transmit data from a Sniffer4D to the analytic software in real time; *TX power: 500mW; *Range: ①theoretical maximum: ~7km, ②in typical open areas: 3~5km, ③in typical urban areas (unblocked): 1~2km.	
	High-Precision Satellite Positioning Module	*Support GPS, Beidou and GLONASS; *Typical positioning accuracy ~ ± 2m; *Provide time stamps and georeference for each set of air quality data.	
	Temperature, Humidity and Pressure Sensor	*Range: -40~85°C, 0~100%RH, 30kPa~110kPa; *Theoretical resolutions: 0.1°C, 0.1%RH, 0.01kPa; *Time resolution: 1s; *Provide temperature, humidity and barometric-based relative altitude information for each set of air quality data.	
	High-strength Lightweight Carbon Fiber Casing	*Strong and rugged design; *Resistant to external electromagnetic interference (from sources such as drone telemetry, video downlink, motors, ESCs, etc.); *Built-in suspension mechanism; *Easy to integrate with various types of aerial & ground vehicles; *Dimensions: 150 x 148 x 50mm (without antenna and GPS).	
	Active Air Intake system	*Allow the internally mounted sensors to quickly and effectively contact the outside air to shorten the response time; *Stabilize airflow inside Sniffer4D under different speeds; *Reduce turbulence from drone propellers.	
	Power System	*Provide two power options: 7~25V DC input (XT30 port on the side of Sniffer4D, requires >12W) or 5V DC input (Micro USB port at the back of Sniffer4D, requires >10W);	
	SD Card Data Backup Module	*No software intervention is required. Monitoring data (.s4d format) is automatically backed up in the SD card each time a Sniffer4D is warmed up and has GPS fix; *Data stored in the SD card can be imported into Sniffer4D Mapper for analysis; *Support up to 32GB MicroSD card; *Come with 8/16GB industrial grade MicroSD card; *Can storage >4100 hours of data (16g);	
	Carrying Case	*Waterproof (IP67) hand carrying case for transporting and storing Sniffer4D; *Dimensions: 295 x 205 x 91mm.	
	Sniffer4D Mapper Analytic Software	*Display real-time working status of Sniffer4D, such as GPS satellite number, relative altitude, volume of data to be retrieved; *Data retrieval algorithm - to retrieve lost data during communication breakdown; *Display real-time measurement values and their time series graphs; *Generate 2D grid air pollution heat map in real-time; *Generate 2D contour air pollution heat map in real-time; *Generate 3D point cloud air pollution heat map in real-time; *Support loading multiple historical data files from the cloud and locally into the software for post analysis; *Support loading orthophoto (GeoTiff, WGS84) into the software; *Support loading geotaggged photos and showing them in the pollution heat map; *Support automatic mission report (PDF) generation; *Support exporting mission files as a datasheet (CSV); *Support fixed-point missions in GPS-denied environments; *Three built-in demo missions (drone mounted, car-mounted, and helicopter-mounted); *Display detailed working status of each sensing module inside a Sniffer4D; allow users to calibrate the sensitivity (slope) and zero point (intercept) of each sensing module inside a Sniffer4D. *When the optional 4G Data Transmission Module (see below for details) is connected, ① the real-time data of one Sniffer4D can be transmitted to multiple designated computers in various locations, ② the real-time data of multiple Sniffer4Ds in various locations can be transmitted to one designated computer, ③ the real-time data of multiple Sniffer4Ds in various locations can be transmitted to multiple designated computers in various locations. *Support 64-bit Windows 10 (full functionality) and Android (partial functionality); *Unlimited software installations; *Automatic software update.	

Optional Components Sniffer4D has 9 mounting spaces. Users can choose what they want to measure according to their needs.	Inhalable Particulate Matter (PM2.5&10) Sensing Module Occupies 2 mounting spaces	*Detection method: laser scattering/light scattering; *Sense PM1.0 (particle size 0.3~1um), PM2.5 (particle size 0.3~2.5um), and PM10 (particle size 0.3~10um); *Particle counting effectiveness: 50% @ 0.3um, 98% @> 0.5um; *Range: 0~1000ug/m3; *Detection limit: 1ug/m3; *Repeatability: <2% FS; *Resolution: 1ug/m3; *Time resolution: 1Hz; *Overall response time: <10s; *Estimated service life: >36 months; *Proprietary humidity correction algorithm, providing more accurate measurement in wide humidity range; *Weight: 29g.	**For general environmental monitoring*
	High-resolution O3+NO2 Sensing Module Occupies 1 mounting space	*Detection method: electrochemistry; *Sensitive to both O3 and NO2 gases, but unable to identify individual concentrations; *Range: 0~10ppm; *Detection limit: 5ppb; *Repeatability: <4% FS; *Response time (t90): <45 seconds (from 0 to 1ppm); *Theoretical resolution: 0.5 ppb; *Time resolution: 1Hz; *Built-in dedicated data processing chip; *Proprietary environmental compensation algorithm and individual difference compensation algorithm; *Special circuit and algorithm design to greatly reduce the preheating stabilization time to <10 minutes; *Sensitivity drift: -20~-40%/year (in laboratory environment); *Zero drift: 0~20ppb/year (in laboratory environment); *Estimated service life: >24 months; *Operating temperature: -30~40°C; *Operating humidity: 15-85%RH; * Weight: 20g.	**For general environmental monitoring* **O3+NO2 is also called "Ox", or "photochemical oxidant", indicating the oxidizability of air.* **If you need to calculate the concentration of O3 alone, you need to do a subtraction: O3=(O3+NO2)-NO2*
	High-resolution NO2 Sensing Module Occupies 1 mounting space	*Detection method: electrochemistry; *Range: 0~10ppm; *Detection limit: 5ppb; *Repeatability: <4% FS; *Response time (t90): <60 seconds (from 0 to 2ppm); *Theoretical resolution: 0.7ppb; *Time resolution: 1Hz; *Built-in dedicated data processing chip; *Proprietary environmental compensation algorithm and individual difference compensation algorithm; *Special circuit and algorithm design to greatly reduce the preheating stabilization time to <10 minutes; *Sensitivity drift: -20~-40%/year (in laboratory environment); *Zero drift: 0~20ppb/year (in laboratory environment); *Estimated service life: >24 months; *Operating temperature: -30~40°C; *Operating humidity: 15-85%RH; * Weight: 20g.	**For general environmental monitoring*
	High-resolution CO Sensing Module Occupies 1 mounting space	*Detection method: electrochemistry; *Range: 0~10ppm; *Detection limit: 10ppb; *Repeatability: <4% FS; *Response time (t90): <20 seconds (from 0 to 10ppm); *Theoretical resolution: 0.7ppb; *Time resolution: 1Hz; *Built-in dedicated data processing chip; *Proprietary environmental compensation algorithm and individual difference compensation algorithm; *Special circuit and algorithm design to greatly reduce the preheating stabilization time to <6 minutes; *Sensitivity drift: <10%/year (in laboratory environment); *Zero drift: <±100ppb/year (in laboratory environment); *Estimated service life: >36 months; *Operating temperature: -30~50°C; *Operating humidity: 15-90%RH; * Weight: 20g.	**For general environmental monitoring*
	High-resolution SO2 Sensing Module Occupies 1 mounting space	*Detection method: electrochemistry; *Range: 0~15ppm; *Detection limit: 5ppb; *Repeatability: <4% FS; *Response time (t90): <40 seconds (from 0 to 2ppm); *Theoretical resolution: 0.5ppb; *Time resolution: 1Hz; *Built-in dedicated data processing chip; *Proprietary environmental compensation algorithm and individual difference compensation algorithm; *Special circuit and algorithm design to greatly reduce the preheating stabilization time to <10 minutes; *Sensitivity drift: <±15%/year (in laboratory environment); *Zero drift: <±20ppb/year (in laboratory environment); *Estimated service life: >36 months; *Operating temperature: -30~50°C; *Operating humidity: 15-90%RH; * Weight: 20g.	**For general environmental monitoring* **Cannot be used with Wide-range SO2 module at the same time*

Wide-range SO2 Sensing Module Occupies 1 mounting space	*Detection method: electrochemistry; *Range: 0~100ppm; *Detection limit: 60ppb; *Repeatability: <4% FS; *Response time (t90): <40 seconds (from 0 to 2ppm); *Theoretical resolution: 6ppb; *Time resolution: 1Hz; *Built-in dedicated data processing chip; *Proprietary environmental compensation algorithm and individual difference compensation algorithm; *Special circuit and algorithm design to greatly reduce the preheating stabilization time to <10 minutes; *Sensitivity drift: <15%/year (in laboratory environment); *Zero drift: <±20ppb/year (in laboratory environment); *Estimated service life: >36 months; *Operating temperature: -30~50°C; *Operating humidity: 15-90%RH; * Weight: 20g.	**Not suitable for normal low concentration environmental monitoring* ** Commonly used for oil and gas applications* **Cannot be used with High-resolution SO2 at the same time*
Wide-range Volatile Organic Compounds (VOCs) Sensing Module Occupies 1 mounting space	*Detection method: photoionization detection (PID); *Target gases: volatile organic compounds (VOCs) with ionization potential energy <10.6eV *Range: 0~50ppm (isobutylene); *Detection limit: 1ppb; *Repeatability: <4% FS; *Response time (t90): <3 seconds (diffusion mode); *Theoretical resolution: 3.8 ppb; *Time resolution: 1Hz; *Built-in dedicated data processing chip; *Humidity has almost no effect on the measurement in 0~75%RH; *Preheating stabilization time: ~10 minutes; *Estimated service life: 5000 working hours; *Operating temperature: -40~55°C; *Operating humidity: 0-95%RH; *The default target gas is isobutylene. To measure other types of VOC, users need to adjust the sensitivity factor of the module; *Weight: 11g.	**Commonly used for odor source search in environmental monitoring;* **Often used to find the cause of high O3 concentration;* **Commonly used for oil and gas applications;* **For details about all the detectable VOCs, please refer to "Target VOCs and Their Correction Parameters for Sniffer4D's VOCs Module"*
Wide-range CxHx (flammable gas) Sensing Module Occupies 1 mounting space	*Detection method: non-dispersive infrared (NDIR); *Target gases: hydrocarbons (flammable gases); *Range: 0~5%VOL (0~100%LEL) methane, or 0~2%VOL propane; *Detection limit: 0.01%; *Repeatability: <2% FS; *Accuracy: ±10%; *Response time (t90): <30s; *Theoretical resolution: 0.01% (100ppm); *Time resolution: 1Hz; *Built-in dedicated data processing chip; *Preheating stabilization time: ~1 minute; *Zero drift: <±0.05% VOL/month; *Estimated service life: >5 years; *Operating temperature: -20~50°C; *Operating humidity: 0~95%RH; *The default target gas is methane (CH4). To measure other types of hydrocarbon, users need to adjust the sensitivity factor of the module; * Weight: 22g.	**Commonly used for oil and gas and emergency response applications*
Wide-range HCl Sensing Module Occupies 1 mounting space	*Detection method: electrochemistry; *Range: 0~100ppm; *Detection limit: 1ppm; *Repeatability: <4% FS; *Response time (t90): <200 seconds (from 0 to 25ppm); *Theoretical resolution: 100ppb; *Time resolution: 1Hz; *Built-in dedicated data processing chip; *Special circuit and algorithm design to greatly reduce the preheating stabilization time to <10 minutes; *Estimated service life: >24 months; *Operating temperature: -30~50°C; *Operating humidity: 15-90%RH; * Weight: 20g.	**Commonly used for oil and gas applications*
Wide-range H2S Sensing Module Occupies 1 mounting space	*Detection method: electrochemistry; *Range: 0~50ppm; *Detection limit: 20ppb; *Repeatability: <4% FS; *Response time (t90): <55 seconds (from 0 to 2ppm); *Theoretical resolution: 1ppb; *Time resolution: 1Hz; *Built-in dedicated data processing chip; *Proprietary environmental compensation algorithm and individual difference compensation algorithm; *Special circuit and algorithm design to greatly reduce the preheating stabilization time to <8 minutes; *Sensitivity drift: <20%/year (in laboratory environment); *Zero drift: <±100ppb/year (in laboratory environment); *Estimated service life: >24 months; *Operating temperature: -30~50°C; *Operating humidity: 15-90%RH; * Weight: 20g.	** Commonly used for odor emission source search in environmental monitoring* ** Commonly used in the oil and gas industry*

	Wide-range H2 Sensing Module Occupies 1 mounting space	*Detection method: electrochemistry; *Range: 0~3000ppm; *Detection limit: 15ppm; *Repeatability: <5% FS; *Response time (t90): <55 seconds (from 0 to 400ppm); *Theoretical resolution: 0.8ppm; *Time resolution: 1Hz; *Built-in dedicated data processing chip; *Special circuit and algorithm design to greatly reduce the preheating stabilization time to <10 minutes; *Zero drift: <±10ppm/year (in laboratory environment); *Estimated service life: >24 months; *Operating temperature: -30~50°C; *Operating humidity: 15-90%RH; * Weight: 20g.	**Commonly used for monitoring hydrogen leakage during nuclear power plant accidents*
	Wide-range NH3 Sensing Module Occupies 1 mounting space	*Detection method: electrochemistry; *Range: 0~100ppm; *Detection limit: 5ppm; *Repeatability: <5% FS; *Response time (t90): <150 seconds (from 0 to 50ppm); *Theoretical resolution: 0.3ppm; *Time resolution: 1Hz; *Built-in dedicated data processing chip; *Special circuit and algorithm design to greatly reduce the preheating stabilization time to <10 minutes; *Sensitivity drift: <3%/year (in laboratory environment); *Zero drift: <±2ppm/year (in laboratory environment); *Estimated service life: >24 months; *Operating temperature: -30~50°C; *Operating humidity: 15-90%RH; * Weight: 20g.	**Commonly used for odor emission source search in environmental monitoring*
	Total Suspended Particulate Matter (TSP/PM100) Sensing Module Occupies 4 mounting spaces	*Detection method: laser light scattering/light scattering; *Detect PM100 (TSP) values (detectable particle size 1~100um); *Range: 0~20mg/m3; *Theoretical resolution: 1ug/m3; *Time resolution: 1Hz; *Overall response time: <6s; *Estimated service life: >36 months; *Proprietary humidity correction algorithm, providing more accurate measurement in wide humidity range; *Due to its large size, a special version of the sensor module motherboard is required; * Weight: to be tested.	**Commonly used for dust monitoring in environmental monitoring*
	4G Data Transmission Module (1 pair) Does not occupy any mounting space	*Transmit real-time data from Sniffer4D to Sniffer4D Mapper analytic software via cellular network; *Support GPRS, EDGE, 3G, and 4G; *TX power: 23~33dBm; *A Mini SIM card is required; *Can work simultaneously with Sniffer4D's built-in 433MHz radio telemetry; *Supports 1-to-1, 1-to-many, many-to-many configuration; *With status LEDs (power supply status, data transmission status, cloud platform status, sim card status); * Weight: 36g (Sniffer4D end).	
	Decoding Module Does not occupy any mounting space	*Decode encrypted real-time data from Sniffer4D into readable plaintext data, so that users can import the decoded real-time monitoring data from Sniffer4D into other devices (such as drone flight controllers, etc.); *Serial output (Baud rate: 115200).	**Come with Sniffer4D upon request*
Supports	Technical Support	*Telephone and video conference technical support during normal working hours during the warranty period.	**Come with Sniffer4D*
	Customer Training	*In person training in Shenzhen, or remote training via video conference.	
	Warranty Policy	*1 year non-human damage warranty; *Lifetime paid repair service.	
Drone Integration Kits	DJI M100 Integration Kit	*For mounting Sniffer4D onto a DJI M100 drone; *Material: high strength carbon fiber; *Adjustable center of gravity; *Sniffer4D is powered using M100's XT30 power port; *Weight: 59g.	**Incorrect installation method may cause drone crash, inaccurate data, and bad transmission. Therefore, users are strongly advised to use our specially designed mounting kits that has been heavily tested*
	DJI M210/M210 RTK Integration Kit	*For mounting Sniffer4D onto a DJI M210/M210 RTK drone; *Material: high strength carbon fiber; *Adjustable center of gravity; ***Seamless integration through DJI Payload SDK, Sniffer4D's real-time readings can be viewed in DJI Pilot App;** *Sniffer4D is powered using DJI SkyPort; *Weight: 120g.	
	DJI M600/M600 Pro Integration Kit	*For mounting Sniffer4D onto a DJI M600/M600 Pro drone; *Material: high strength carbon fiber; *Sniffer4D is powered using M600's XT30 power port; *Weight: 125g.	
Customization	Customized Logo	*Option 1: no Soarability's logo in the hardware and software; *Option 2: customized logo in Sniffer4D's hardware and software (software automatic update will not be available).	**In principle, the intellectual property generated during the development process belongs to the manufacturer*
	Customized Functionality (Software)	*Customized software functionality (such as linking with customers' own cloud platform) for specific customers.	
	Customized Functionality (Hardware)	*Customized hardware functionality (such as adding a new sensing module) for specific customers.	